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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,143	07/08/2003	Rajiv Laroia	Flarion-82	2082
26479	7590	04/06/2007		
STRAUB & POKOTYLO 620 TINTON AVENUE BLDG. B, 2ND FLOOR TINTON FALLS, NJ 07724			EXAMINER TIMORY, KABIR A	
			ART UNIT	PAPER NUMBER
			2609	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/616,143	<b>Applicant(s)</b> LAROIA ET AL.	
	<b>Examiner</b> Kabir A. Timory	<b>Art Unit</b> 2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 08 July 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>4/3/2006; 7/8/2003</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 1-23 are objected to because of the following informalities:
  - (1) Claim 1, lines 1, 2, 3, 4, 8, 13 and 14: The term "M" should be defined in the claim. It is unclear to the examiner what value "M" acquires.
  - (2) Claim 1, lines 6, 8, and 11: The term "N" should be defined in the claim. It is unclear to the examiner what value "N" acquires.
  - (3) Claim 14, lines 3, 4, 5, 9, 10, 11, 12, 13, 16, 17, and 20: The term "M" should be defined in the claim. It is unclear to the examiner what value "M" acquires.
  - (4) Claim 14, line 6: The term "N" should be defined in the claim. It is unclear to the examiner what value "N" acquires.

**Appropriate correction is required.**

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2609

3. Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Shattil et al. (US Pub. Number 2003/0147655) in view Maric et al. (US Patent Number 7,068,703).

**Regarding claim 1:**

Shattil et al., discloses transmitting signals on a plurality of M subcarrier (figure 6, 601, 602, 603) signals in parallel (this limitation is inherent because in OFDM system frequency carriers are in parallel), each of said M subcarrier signals corresponding to a different one of M subcarrier signal frequencies (figure 6, 601, 602, 603), said M subcarrier signal frequencies being a subset of N subcarrier frequencies on which said communications device may transmit signals over time (figure 6, 601.P, 602.P, 603.P).

- a frequency control circuit (figure 4, 418n) for controlling which of the N subcarrier frequencies are used by said device for the transmission of signals (paragraph 0111, lines 4-8);
- a plurality of M separate subcarrier signals paths (figure 6) operating in parallel, teaches each of the M subcarrier signal paths including a programmable signal generator coupled to said frequency control circuit (figure 4A, figure 5A, 420' & figure 9C, 999, 991, 992), a power amplification circuit and a filter circuit (paragraph 0113, lines 5-6), said programmable signal generator for generating a subcarrier signal having a subcarrier frequency corresponding to said subcarrier signal path to which said signal generator corresponds (paragraph 0100, lines 1-9); and

Art Unit: 2609

- a combining circuit (figure 4A, 420) for combining analog subcarrier signals corresponding to different subcarrier signal paths prior to transmission.

Shattil et al. disclose all of the subject matter as described above except for specifically teaching a frequency hopping device and  $M < N$ .

However, Maric et al., in the same field of endeavor, teaches a frequency hopping device (column 1, line 12) and where  $M < N$  (figure 3A, column 6, line 43).

One of ordinary skill in the art would have clearly recognized that in wireless communication systems, the receiver sends the transmitter a message which indicates whether the transmitted data was successfully received. The transmitted can be lost or corrupted due to interference in the network. In wireless communication, co-channel interference, multipath fading, and shadow fading are among the types of interference, which may prevent the receiver from successfully receiving transmitted data. To average the interference in the network and overcome the interference problem, it would have been obvious to one ordinary skill in the art at the time the invention was made to use frequency hopping technique as taught by Maric et al. In a multi-carrier communication system such as OFDM, which employ multiple frequency bands for data transmission, OFDM effectively partitions the overall system bandwidth into  $N$  orthogonal subbands (subcarrier), which are also referred to as tones, frequency bins, and so on. In a typical OFDM system, only  $M$  of the  $N$  total subbands (subcarrier) are used for pilot and data transmission, where  $M < N$ . Using frequency hopping technique, will average the interference such as multipath and co-channel interference in the system and improve the performance of the network.

**Regarding claim 2:**

Shattil et al. further discloses:

each of the M signal filter circuits (filter bank include plurality of filters) (figure 13, 1302), that each correspond to a different one of said M signal paths, is a fixed filter (a fixed filter is interpreted to be a filter) (paragraph 0101, lines 5-13), at least one of the M fixed filters having a passband bandwidth (this limitation is inherent because passband is the portion of spectrum, between limiting frequencies, that is transmitted with minimum relative loss or maximum relative gain by a filtering device) at least equal to Y times the average frequency spacing between the N frequencies that said device can use as the N subcarrier frequencies (figure 6, 601, 602, 603), where Y is a positive number greater than 1 (paragraph 0075, lines 1-4).

**Regarding claim 3:**

Shattil et al. further discloses:

wherein  $Y \geq N \text{ divided by } M$  (paragraph 0075, line 8).

**Regarding claim 4:**

Shattil et al. further discloses:

Y is at least as large as N (paragraph 0075, line 6).

**Regarding claim 5:**

Shattil et al. further discloses:

each of said M signal filter circuits are identical fixed filters each having a passband bandwidth covering the full set of N subcarrier signal frequencies which may be used by said device (paragraph 0199, lines 1-11).

**Regarding claim 6:**

Shattil et al. further discloses:

the M subcarrier signals are OFDM subcarrier signals and where the N subcarrier frequencies are evenly spaced frequencies (figure 6, 601, 602, 603).

**Regarding claim 7:**

Shattil et al. further discloses:

the fixed filter included on each of said M signal paths is positioned in series with said corresponding power amplification circuit either before or after the corresponding power amplification circuit (figure 8, 814, 801, 802).

**Regarding claim 8:**

Shattil et al. further discloses:

- the programmable signal generator (figure 4A, figure 5A, 420' & figure 9C, paragraph 0141, lines 4-5) included in each subcarrier signal path generates an analog subcarrier signal; and
- wherein said power amplification circuit and said filter circuit included in each subcarrier signal path are analog circuits (paragraph 0113, lines 5-6, paragraph 0198, lines 10-11).

**Regarding claim 9:**

Shattil et al. further discloses:

each of the M signal filter circuits, that each correspond to a different one of said M signal paths, is a programmable filter (figure 9C, paragraph 0113, lines 5-6).

**Regarding claim 10:**

Shattil et al. further discloses:

each of the M programmable filters (filter bank include plurality of filters) (figure 13, 1302, figure 9C) has a passband corresponding to the subcarrier signal frequency of the subcarrier signal (this limitation is inherent because passband is the portion of spectrum, between limiting frequencies, that is transmitted with minimum relative loss or maximum relative gain by a filtering device) generated by the programmable signal generator circuit included on the same subcarrier signal path as the programmable filter (figure 9C, paragraph 0101, lines 1-16).

**Regarding claim 11:**

Shattil et al. further discloses:

the programmable filters(filter bank include plurality of filters) (figure 13, 1302, figure 9C) have a passband which has a bandwidth sufficient to pass said subcarrier signal but reject the nearest neighboring one, in frequency, of said N subcarrier signals (paragraph 0199, lines 1-11).

**Regarding claim 12:**

Shattil et al. further discloses:

- said device further transmits information using at least one additional preselected subcarrier frequency (figure 2B, paragraph 0061, lines 3-8) ,

the device further comprising:



Art Unit: 2609

- an additional subcarrier signal path including an amplifier and fixed filter (figure 8, 802) for amplifying and filtering a subcarrier signal corresponding to said additional preselected subcarrier frequency (paragraph 0113, lines 5-6).

**Regarding claim 13:**

Shattil et al. further discloses:

said additional subcarrier frequency corresponds to a control channel used to transmit control information (paragraph 0111, lines 4-8).

**Regarding claim 14:**

Shattil et al., discloses transmit information using M subcarrier signals at a time (figure 6, 601, 602, 603), each of the M subcarrier signals corresponding to a different subcarrier frequency (figure 6, 601, 602, 603), and where N is the total number of different subcarrier frequencies said device can use over time (figure 6, 601.P, 602.P, 603.P), the method comprising:

- i) operating M programmable signal generators (pulse generator is interpreted to be signal generator) (figure 8, 801, & figure 9C) to generate said M subcarrier signals;
- ii) separately processing each of the M subcarrier signals to produce M processed subcarrier signals (paragraph 0102, lines 1-2), the processing of each of said M subcarrier signals including a amplification operation and a filtering operation, said separate processing thus including M separate filtering operations (paragraph 0113, lines 5-6); and
- iii) combining the M processed subcarrier signals to generate a frequency division multiplexed transmission signal (figure 4A, 420);

Art Unit: 2609

- iv) controlling at least one of said M programmable signal generators to change the frequency of the subcarrier signal generated by said at least one programmable signal generator (figure 9C, paragraph 0111, lines 4-8); and
- v) repeating steps (i), (ii), and (iii) (this limitation is inherent because steps I-iii can be repeated in the system).

Shattil et al. disclose all of the subject matter as described above except for specifically teaching a frequency hopping communication method and where M is less than N.

However, Maric et al., in the same field of endeavor, teaches a frequency hopping communication method (column 1, line 12) and where M is less than N (figure 3A, column 6, line 43).

One of ordinary skill in the art would have clearly recognized that in wireless communication systems, the receiver sends the transmitter a message which indicates whether the transmitted data was successfully received. The transmitted can be lost or corrupted due to interference in the network. In wireless communication, co-channel interference, multipath fading, and shadow fading are among the types of interference, which may prevent the receiver from successfully receiving transmitted data. To average the interference in the network and overcome the interference problem, it would have been obvious to one ordinary skill in the art at the time the invention was made to use frequency hopping technique as taught by Maric et al. In a multi-carrier communication system such as OFDM, which employ multiple frequency bands for data transmission, OFDM effectively partitions the overall system bandwidth into N

orthogonal subbands (subcarrier), which are also referred to as tones, frequency bins, and so on. In a typical OFDM system, only  $M$  of the  $N$  total subbands (subcarrier) are used for pilot and data transmission, where  $M < N$ . Using frequency hopping technique, will average the interference such as multipath and co-channel interference in the system and improve the performance of the network.

**Regarding claim 15:**

Shattil et al. further discloses:

said  $M$  subcarrier signals are analog signals and wherein said filtering operation is an analog filtering operation (paragraph 0198, lines 10-11).

**Regarding claim 16:**

Shattil et al. further discloses:

said  $M$  separate filtering operations are performed using  $M$  separate fixed filters (a fixed filter is interpreted to be a filter) (paragraph 0101, lines 5-13), at least one of the  $M$  fixed filters having a bandwidth at least equal to  $Y$  times the average frequency spacing between the  $N$  frequencies that said device can use as the  $N$  subcarrier frequencies (figure 6, 601, 602, 603), where  $Y$  is a positive number greater than 1 (paragraph 0075, lines 1-4).

**Regarding claim 17:**

Shattil et al. further discloses:

wherein  $Y \geq N$  divided by  $M$  (paragraph 0075, line 8).

**Regarding claim 18:**

Shattil et al. further discloses:

Art Unit: 2609

wherein Y is equal to or greater than N (paragraph 0075, line 6).

**Regarding claim 19:**

Shattil et al. further discloses:

said M separate filtering operations are performed using identical fixed filters each having a bandwidth covering the full set of N subcarrier signal frequencies which may be used by said device (paragraph 0199, lines 1-11).

**Regarding claim 20:**

Shattil et al. further discloses:

the N subcarrier signals are OFDM subcarrier signals (figure 6, 601.P, 602.P, 603.P).

**Regarding claim 21:**

Shattil et al. further discloses:

said M separate filtering operations are performed using M separate programmable filters, the frequency of each of each of the M programmable filters corresponding to the frequency of the subcarrier signal being filtered.

**Regarding claim 22:**

Shattil et al. further discloses:

changing the amount of power amplification performed on one of the M subcarrier signals when the frequency of said subcarrier signal is changed (figure 9C, paragraph 0101, lines 1-16).

**Regarding claim 23:**

Shattil et al. further discloses controlling at least one of said M programmable signal generators to change the frequency of the subcarrier signal includes:

- operating said M programmable generators to switch from generating a first set of M subcarrier signals corresponding to a first set of M uniformly spaced subcarrier frequencies to generating a second set of M subcarrier signals corresponding to a second set of M uniformly spaced subcarrier frequencies (figure 9C, paragraph 0101, lines 1-16),
- a first subcarrier frequency in said first set of M subcarrier frequencies being separated from a first subcarrier frequency in said second set of M subcarrier frequencies by a frequency spacing that is less than Y times the frequency spacing between subcarrier signals in said first and second sets of M subcarrier signals (figure 6, 601, 602, 603, paragraph 0071, lines 3-7).

### ***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kostic et al. (US Patent Number 6,549,784) discloses method and apparatus for implementing measurement based dynamic frequency hopping in wireless communication systems, Dolgonos et al. (US Patent Number 7,002,934) discloses a OFDM multiple ypstream receiver network, and Gillis et al. (US Patent Number 5,323,447) discloses apparatus and method for modifying a frequency hopping sequence of a cordless telephone operating in a frequency hopping system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kabir A. Timory whose telephone number is (571) 270-

Art Unit: 2609

1674. The examiner can normally be reached on Mon - Thu 6:30AM - 4:00PM & Fri 6:30AM - 3:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kabir A. Timory

March 30, 2007



SHUWANG LIU  
SUPERVISORY PATENT EXAMINER